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SCIENCE

FRIDAY, SEPTEMBER 21, 1917

CONTENTS

<i>The Magnetic Field of an Atom:</i> DR. W. J. HUMPHREYS	273
<i>Kentucky as an Oil State:</i> JAMES H. GARDNER.	279
<i>Overwintering of the Apple-scab Fungus:</i> DR. W. P. FRASER	280
<i>Scientific Events:—</i>	
<i>Baron Dairoku Kikuchi; The Production of Potash in the United States; The Museum of the Royal College of Surgeons of England; The Mayo Foundation and the University of Minnesota</i>	282
<i>Scientific Notes and News</i>	284
<i>University and Educational News</i>	287
<i>Discussion and Correspondence:—</i>	
<i>On the Rawness of Subsoils:</i> DR. CHAS. B. LIPMAN. <i>Northern Lights:</i> THOMAS BYRD MAGATH. <i>The New Moon:</i> DR. OTTO KLOTZ. <i>Erasmus Darwin and Benjamin Franklin:</i> PROFESSOR LORANDE LOSS WOODRUFF	288
<i>Scientific Books:—</i>	
<i>MacNutt on the Modern Milk Problem:</i> PROFESSOR LEO F. REITGER	292
<i>Special Articles:—</i>	
<i>Gravitational Repulsion:</i> PROFESSOR FRANCIS F. NIPHER. <i>The Catalase Content of Luminous and Non-luminous Insects compared:</i> DR. W. E. BURGE. <i>The Effect of Smelter Gas on Insects:</i> R. W. DOANE	293

THE MAGNETIC FIELD OF AN ATOM¹

THE substance and structure of the atom, the movements of its parts, and its properties, are, perhaps, the most fundamental subjects of modern physical investigation. And although the structure and even the substance of the atom can as yet only be inferred, nevertheless its numerous and varied phenomena not only challenge the theorist, but also, through their manifold checks, afford him at every turn the very best guidance to an approximately correct inference. Among the more important of these phenomena are the actions of atoms in respect to absorption and emission of radiation under various conditions of temperature, pressure, magnetic and electric fields. Crystal forms, chemical reactions and magnetic properties offer additional suggestions and valuable tests.

One of the most interesting inferences concerning the atom is this: that it has a very powerful magnetic field. This inference is supported by a number of investigations of entirely different character which it is proposed in what follows to outline briefly and in approximately their chronological order.

1. The electromagnetic theory of ether vibrations so satisfactorily accounted for many known phenomena and so successfully predicted others, including wireless telegraphy, that it was long ago generally believed that all radiation, including light,

¹ Presented at the symposium on "The Structure of Matter" at a joint meeting of the Sections of Physics and Chemistry of the American Association for the Advancement of Science, The American Physical Society and the American Chemical Society, New York, December 27, 1916.